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ART UNIT	**PAPER NUMBER**
2671	

DATE MAILED: 02/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/826,973	Applicant(s) NILES ET AL.	
	Examiner Jason M. Repko	Art Unit 2671	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on ____.

2a)☐ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-82* is/are pending in the application.

4a) Of the above claim(s) *23-55* is/are withdrawn from consideration.

5)☐ Claim(s) ____ is/are allowed.

6)☒ Claim(s) *1-22 and 56-82* is/are rejected.

7)☐ Claim(s) ____ is/are objected to.

8)☒ Claim(s) *1-82* are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 October 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. ____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date ____.

4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: ____.

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DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

   I. Claims 1-22 and 56-82 are drawn to an animation method, classified in class 345, subclass 473.

   II. Claims 23-55 are drawn to user interface, classified in class 345, subclass 650.

2. Inventions of an animation method and user interface are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention of an animation method has separate utility such as use in an animation system that is able to acquire the input and parameters from a file created without using the controls specified by the user interface or a script. See MPEP § 806.05(d).

3. During a telephone conversation with Sabre-Anne R. Truesdale on 2/9/2006 a provisional election was made without traverse to prosecute the invention of (I) the animation method, claims 1-22 and 56-82. Affirmation of this election must be made by applicant in replying to this Office action. Claims 23-55 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Specification

4. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. **Claim 70** is rejected under 35 U.S.C. 101 the claimed invention is directed to non-statutory subject matter. The method recited in claim 70 merely traverses a data structure (stack of operations) without achieving a useful result.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. **Claim 63 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.** Claim 63 recites the limitation "the parameter" in line 1. There is insufficient antecedent basis for this limitation in the claim.

9. **Claim 70 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.** Claim 70 uses the phrase “responsive to a single behavior,” which can be interpreted in a number of contradictory ways. The office suggests specifying what is “responsive to” the behavior value being sufficient: the operation of traversing or the stack of operations. Paragraph [1619], which describes the operations in claim 70, lacks the antecedent terminology in the specification to determine the meaning of “responsive to being sufficient” in

claim 70. The office suggests the language "determining if a single behavior," as a step in the method.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

11. Claims 1, 2, 4-7, 9-11, 13, 15, 16, 19, 20, 71-75, and 77-78 rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Application Publication No. 2004/0036711 A1 to Anderson (herein referred to as "Anderson").

12. With regard to claim 1, Anderson discloses "in a computer-implemented animation system (*Figure 7*), a method for animating an object (*paragraph [0008]: "The computer can then determine the changes in the object's representation in subsequent frames of the animation from the applied vector and the object's vector response characteristic. The combination of all the*

changes in the representations of objects allows the computer to determine all the frames in the animation.") the method comprising:

a. receiving a first input, the first input specifying a first behavior, the first behavior indicating how to change a value of a first parameter of the object over time (*paragraph [0008]: "Vectors can be assigned by rule, e.g., gravitational effects, wave motion, and motion boundaries. The user can supply additional vectors to refine the animated motion or behavior"; paragraph [0060]: "The interface acquires a force, e.g., magnitude and direction applied to an input device, indicating a desired change in the object's state 802."; Figure 1 shows an object changing position over time*);

b. animating the object by changing the value of the first parameter of the object over time according to the specified behavior (*paragraph [035]: "An object X3 has a vector V3 applied in the first image I301. Object X3 moves rightward in response to the vector V3, as shown in images I302, I303."*);

c. and outputting the animated object" (*paragraph [061]: "After the user interaction is complete, the graphics iteration 810 can be used to generate the final animation visual sequence."; 811 of Figure 8*).

13. With regard to claim 2, Anderson discloses, "the object comprises a two-dimensional object" (*figure 3 shows a 2D object*).

14. With regard to claim 4, Anderson discloses "receiving a second input, the second input specifying a second behavior, the second behavior indicating how to change a value of a second parameter of the object over time, and wherein animating the object further comprises changing the value of the second parameter of the object according to the second specified behavior"

(paragraph [0054]: "Suppose that the overall effect is still not exactly what the user desired--the user wants the bunny to lean forward as it hops. The user can push on the bunny's back, not affecting the hopping or leg motion, but causing the bunny to lean forward slightly while it hops."). One of ordinary skill in the art would recognize that the vector input is specified by the user input from the statement in paragraph 43 (*"A user can be provided with interface control of how vectors are applied to objects or groups of objects, e.g., a vector can be applied to a hand, or wrist, or arm, depending on a specification of the user."*) and paragraph 60 (*"The interface acquires a force, e.g., magnitude and direction applied to an input device, indicating a desired change in the object's state 802."*).

15. With regard to claim 5, Anderson discloses "receiving a second input, the second input specifying a second behavior, the second behavior indicating how to change the value of the first parameter of the object over time (*paragraph [0051]: "The user positions a cursor near the lower left of the bunny, then pushes upwards and to the right."; paragraph [0051]: "The ground can have a force applied that exactly counters the gravity force (or the gravity force can be defined to end at the ground), so that the bunny comes to rest on the ground."*), and wherein animating the object comprises changing the value of the first parameter of the object according to the first specified behavior and the second specified behavior" (*paragraph [0051]: "The animation system interprets that input force to begin moving the bunny upwards and to the right. The animation system can have a gravity force applied to the bunny, causing the upward motion to slow and eventually reverse, bringing the bunny back to the representation of the ground."*). One of ordinary skill in the art would recognize that the vector input is specified by the user input from the statement in paragraph 43 (*"A user can be provided with interface control of how*

vectors are applied to objects or groups of objects, e.g., a vector can be applied to a hand, or wrist, or arm, depending on a specification of the user.") and paragraph 60 (*"The interface acquires a force, e.g., magnitude and direction applied to an input device, indicating a desired change in the object's state 802."*).

16. With regard to claim 6, Anderson discloses "changing the value of the first parameter of the object according to the first specified behavior and the second specified behavior comprises determining a combined change to the value of the first parameter of the object according to a combination of the first specified behavior and the second specified behavior" (*paragraph [0051] as cited in the rejection of claim 5*). One of ordinary skill in the art would recognize that the force applied to the bunny in Anderson is affected by the gravity behavior and the "upwards to the right" vector behavior "causing the upward motion to slow and eventually reverse, bringing the bunny back to the representation of the ground."

17. With regard to claim 7, Anderson discloses "first behavior comprises one from a group consisting of: a Fade In/Fade Out behavior; a Grow/Shrink behavior; a Motion Path behavior; a Snap Alignment to Motion behavior; a Spin behavior; a Throw behavior; an Align to Motion behavior; an Attracted To behavior; an Attractor behavior; a Drag behavior, a Drift Attracted To behavior, a Drift Attractor behavior, an Edge Collision behavior, a Gravity behavior; an Orbit Around behavior; a Random Motion behavior; a Repel behavior; a Repel From behavior, a Rotational Drag behavior; a Spring behavior; a Vortex behavior; and a Wind behavior," wherein Anderson discloses a Gravity behavior in paragraph [0051].

18. With regard to claim 9, Anderson discloses "the first behavior indicates that the value of the first parameter of the object should be averaged over time" (*paragraph [0045]: " The*

computer can then determine the change in scale of object X61 from the initial image I601 and the scale vector response characteristic, producing an animation sequence as illustrated in images I602, I603."). One of ordinary skill in the art would recognize that uniform scaling of a characteristic of the object over the given frames as shown in I601-I603 is analogous to averaging that characteristic.

19. With regard to claim 10, Anderson discloses "the first behavior indicates that the value of the first parameter of the object should be changed using a user-specified custom change" (*paragraph [0054]: "The user can push on the bunny's back, not affecting the hopping or leg motion, but causing the bunny to lean forward slightly while it hops."*).

20. With regard to claim 11, Anderson discloses "the first behavior indicates that the value of the first parameter of the object should be negated" (*paragraph [0052]: "...the user decides that the bunny rises too quickly on the first jump. The use can apply a force directed downward, for example by positioning a cursor and pushing down on the bunny's head, in real time during playback. The net of the original force, the gravity force, and the downward force, slows the bunny's rate of rise in the first jump."*). One of ordinary skill in the art would recognize that the downward force behavior "slows the rate of rise" by negating the upward force vector behavior applied to the bunny.

21. With regard to claim 13, Anderson discloses "the first behavior indicates that the value of the first parameter of the object should ramp over time" (*paragraph [0007]: "For example, a ball might accelerate proportional to the directed magnitude of an applied vector (for example, a vector applied by a modeling of physics, or a vector applied by user interaction), while a light*

source might change in intensity and color according to the direction and magnitude of an applied vector. ").

22. With regard to claim 15, Anderson discloses "the first behavior indicates that the value of the first parameter of the object should change over time according to a specified rate" (*paragraph [0007]: "For example, a ball might accelerate proportional to the directed magnitude of an applied vector (for example, a vector applied by a modeling of physics, or a vector applied by user interaction), while a light source might change in intensity and color according to the direction and magnitude of an applied vector.* ").

23. With regard to claim 16, Anderson discloses "the first behavior indicates that changes to the value of the first parameter of the object should be executed in reverse order" (*paragraph [0035]: " Alternatively, the vector generation characteristic can generate a vector having magnitude sufficient to* <u>*reverse*</u> *the object's velocity component normal to the surface.* ").

24. With regard to claim 19, Anderson discloses "the object comprises one from a group consisting of: an image object; a text object; a particle system; a filter; a generator; and a behavior," wherein Anderson discloses a particle system (*paragraph [0057]: "The user can place a group of dirt particles where the bunny lands. A dust tool can be activated, for example by selecting an icon having a handle attached to a hoop. The user can sweep the dust tool through the dirt particles--with each sweep, all the particles within the hoop are moved slightly in the direction of the sweep.* ").

25. With regard to claim 20, Anderson discloses "the first behavior comprises at least one user-settable behavior parameter (*paragraph [0024]: " The user specifies a vector V1 to be applied to object X1, where vector V1 can comprise a magnitude, a direction, and an application*

time"), the method further comprising receiving a second input specifying a value for the behavior parameter, and wherein animating the object comprises changing the value of the first parameter of the object according to the first specified behavior and the specified value for the behavior parameter (*paragraph [0027]: "Similarly, if the user wanted object X1 to accelerate faster, an additional vector could be added to vector V1…The computer can then determine all the images in the sequence without the requirement for key frames. The user can specify the motion by applying vectors to objects in the images in the sequence, and can edit the resulting animation intuitively by applying additional vectors."*)."

26. With regard to claim 71, Anderson discloses "a method for animating an object using a behavior comprising:

d. outputting an original animation for the object according to a first behavior; concurrently with outputting the object animation, accepting user input (*paragraph [0052]: "The use can apply a force directed downward, for example by positioning a cursor and pushing down on the bunny's head, in real time during playback."*);

e. and outputting an updated animation for the object according to the user input (*paragraph [0052]: "The net of the original force, the gravity force, and the downward force, slows the bunny's rate of rise in the first jump. The user can apply other forces, in various directions and magnitudes, as the animation plays to produce the desired macro motion across the scene."*).

27. With regard to claim 72, Anderson discloses "the user input comprises a command for changing a value of a parameter of the behavior, and wherein outputting the updated animation comprises outputting the updated animation according to the changed value of the parameter"

(*paragraph [0052]: " The user can apply other forces, in various directions and magnitudes, as the animation plays to produce the desired macro motion across the scene."*). One of ordinary skill in the art would recognize that the command Anderson discloses is "positioning a cursor and pushing down on the bunny's head" which changes the rate the bunny rises.

28. With regard to claim 73, Anderson discloses "the user input comprises a command for applying a second behavior to the object and wherein outputting the updated animation comprises outputting the updated animation according to the first and second behaviors" (*paragraph [0053]: "The user urges the feet downward while the bunny is rising. The hopping motion is not affected, but the bunny's legs move relative to the body in response to the user's input force. The user can replay the animation, at various speeds, applying corrective force inputs to tweak the motion until the legs and body look like the user desires."*).

29. With regard to claim 74, Anderson discloses "the updated animation is performed without interrupting the animation for the object" (*paragraph [0053]: "The user urges the feet downward while the bunny is rising. The hopping motion is not affected, but the bunny's legs move relative to the body in response to the user's input force."*).

30. With regard to claim 75, Anderson discloses "the updated animation reflects the changed value of the parameter in real-time" (*paragraph [0052]: "The use can apply a force directed downward, for example by positioning a cursor and pushing down on the bunny's head, in <u>real time during playback</u>."*).

31. With regard to claim 77, Anderson discloses "outputting the original animation and outputting the updated animation each comprise rendering each of a plurality of frames

sequentially (*paragraph [0061]: "After the user interaction is complete, the graphics iteration 810 can be used to generate the final animation visual sequence."*).

32. With regard to claim 78, Anderson discloses "outputting the original animation and outputting the updated animation each comprise rendering each of a plurality of frames sequentially by calculating a current frame based on a previous frame" (*paragraph [0060]: "The interface then combines that force with other forces acting on the object, e.g., forces applied by rules such as gravity emulation 803. The combined forces affecting the object are used to determine a new state for the object (e.g., a new position, orientation, or deformation), and the sequence repeated."*). Figure 8 shows that the object states for previous frames (804) become the object starting state from the next frame (801).

33. **Claims 21 and 22 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,756,984 to Miyagawa (herein referred to as "Miyagawa").**

34. With regard to claim 21, Miyagawa discloses "in a computer-implemented animation system, a method for animating an object, the method comprising:

f. receiving an input, the input specifying the object (*lines 30-32 of column 11: "With the progression of the game, if a display start time set in relation to an object is reached, a readout object parameter group stored in the CD-ROM 40 corresponding to the object is written into the work area 103f in the RAM 103."*);

g. creating one or more duplicates of the object according to a first plurality of parameters (*lines 26-29 of column 9: "These object groups are generated based on one object parameter group, respectively."; lines 9-11 of column 14: "The generation*

interval 65 in a parameter group designates an interval with which the identical object is generated repeatedly. "); and

h. animating the one or more duplicates by changing a value of a parameter of a duplicate over time according to a second plurality of parameters" (*lines 10-15 of column 9: "The object parameter groups 60, 60a are a set of parameters for defining the movement pattern of an object within the movement information, wherein the movement pattern means the definitions of the generation timing, direction of movement after generation, and the amount of movement, etc."; lines 50-52 of column 19: "Further, at the position of the waterfall 991, the ripple 992 moves downward while spreading, and a new ripple 993 is displayed by being superimposed.* ").

35. One of ordinary skill in the art would recognize that reading the data from a CD-ROM is receiving an input.

36. With regard to claim 22, Miyagawa discloses "receiving an input, the input specifying a parameter, and wherein animating the one or more duplicates comprises changing the value of the parameter of the duplicate over time according to the second plurality of parameters and the specified parameter" (*lines 44-48 of column 12: " For example, if the range is represented by an angle, the direction of the movement vector 66 is changeable within the range of angle. This parameter is optional, and is used for, for example, smoke or clouds.* "; *lines 54-57 of column 12: " Color parameter 68 indicates colors to be added to those of the object. This parameter is optional and is used for, for example, smoke or clouds."*). Miyagawa does not use this explicit language however one of ordinary skill in the art would recognize that a smoke or cloud object is

affected by both random movement parameters and color parameters which is specified by the object parameter group read as input from the CD-ROM in lines 30-32 of column 11.

37. **Claims 56, 66, and 67 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 5,717,848 to Watanabe et al (herein referred to as "Watanabe et al").**

38. With regard to claim 56, Watanabe et al discloses "a method for generating a frame of an object using behaviors, comprising:

i. determining a current state of the object; traversing a data structure to identify behaviors affecting the object (*Figure 4 shows a data structure holding behaviors affecting the object; lines 14-17 of column 6: "The motion path of an object can be searched from the object management node 401, the motion path being stored as a key frame data list 402 in the motion data storage unit 205.")*;

j. accumulating forces for the behaviors affecting the object (*lines 44-49 of column 6: " It is to be noted, however, that the velocity vector to be changed is processed both as the end point data of the path extending from the preceding key frame and as the start point data of the path extending to the succeeding key frame, to thereby enable to change the preceding and succeeding paths at the same time."*);

k. and generating a frame of the object according to the accumulated forces (*lines 53-56 of column 7: "An image rendering unit 704 generates an animation image by using the data defined by the shape inputting and processing unit 701, attribute setting unit 702, and motion setting unit 703."*).

39. One of ordinary skill in the art would recognize the velocity vectors are analogous to forces for the behaviors affecting the object from lines 64-67 of column 1: " In order to achieve

the above objects of the present invention, the position of an object and at least one of the magnitude and direction of the velocity of the object velocity are designated for each key frame."

40. With regard to claim 66, Watanabe et al discloses "at least one object state is specified in terms of a keyframe (*lines 14-17 of column 6: "The motion path of an object can be searched from the object management node 401, the motion path being stored as a key frame data list 402 in the motion data storage unit 205."*), the method further comprising converting at least one keyframe into a set of forces that, when applied to the object, approximate the motion represented by the keyframe" (*lines 24-26 of column 2: "For setting the position of an object, both or one of the position and velocity of an object at each key frame is used so that a computer can automatically generate a motion path between key frames."*).

41. With regard to claim 67, Watanabe et al discloses "converting at least one keyframe into a set of forces comprises deriving a set of forces based on the velocity and acceleration at the keyframe" (*lines 49-59 of column 2: "...means for calculating information representative of a motion path from the start point to the end point of the motion of the object... the information representative of at least one of the magnitude and direction of the velocity at the start point of the motion of the object...and the information representative of at least one of the magnitude and direction of the velocity at the end point of the motion of the object."*).

Claim Rejections - 35 USC § 103

42. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

43. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

44. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson in view of Watanabe et al.

45. With regard to claim 3, Anderson discloses the limitations of parent claim 1; however, Anderson does not expressly disclose "a second input specifying a keyframe indicating the value for the first parameter of the object at a first point in time." Watanabe et al discloses "receiving a second input, the second input specifying a keyframe indicating the value for the first parameter of the object at a first point in time (*lines 64-67 of column 1: "In order to achieve the above objects of the present invention, the position of an object and at least one of the magnitude and direction of the velocity of the object velocity are designated for each key frame."*), and wherein animating the object comprises changing the value of the first parameter of the object according to the specified behavior and further according to the specified keyframe" (*lines 28-32 of column 2: "Similarly, for setting the facing direction of an object, both or one of the facing direction of an object and its angular velocity at each key frame is used so that a computer can automatically generate the facing direction of the object between key frames."*).

46. Anderson and Watanabe et al are analogous art because they are from the same field of endeavor: animation. At the time of the invention, it would have been obvious to a person of

ordinary skill in the art to incorporate keyframes as taught by Watanabe et al in the animation framework disclosed by Anderson. The motivation for doing so would have been to set the position of an object at a point in the animation without having to build up a set of input that procedurally defines the animation. Therefore, it would have been obvious to combine Anderson with Watanabe et al to obtain the invention specified in claim 3.

47. **Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson in view of U.S. Patent No. 5,883,639 to Walton et al (herein referred to as "Walton et al").**

48. With regard to claim 8, Anderson shows the limitations of parent claim 1, and "first behavior comprises one from a group consisting of: a Crawl Left behavior; a Crawl Right behavior; a Scroll Up behavior; a Scroll Down behavior, a Randomize behavior; a Sequence behavior; a Position behavior; a Rotation behavior; an Opacity behavior, a Scale behavior, a Tracking behavior; and a Type On behavior," wherein Anderson shows a scale behavior (*paragraph [0007]: "An object within a frame has an initial representation, e.g., position, orientation, scale, intensity, etc. A vector response characteristic can be associated with the object, where the vector response characteristic specifies how the representation of the object changes in response to applied vectors. "*). Anderson does not disclose the object comprising a text object. Walton et al shows an animated object comprising a text object that can have behaviors attached to it (*lines 62-67 of column 12: "Line attributes, drawing modes, shapes and <u>text</u> may also be selected in accordance with techniques known to those skilled in the art."; Fig. 4b shows behaviors*).

49. Anderson and Walton et al are analogous art because they are from the same field of endeavor: animation. At the time of the invention, it would have been obvious to a person of

ordinary skill in the art to incorporate a text object as taught by Walton et al in the system disclosed by Anderson. The motivation for doing so would have been to enhance the usability and efficiency of the method in the computer implemented animation system so the animator can be more productive, otherwise the letters would have to be created by grouping primitive shapes. Therefore, it would have been obvious to combine Anderson with Walton et al to obtain the `invention specified in claim 8.

50. Claims 12, 14, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson in view of Miyagawa.

51. With regard to claims 12, 14 and 18, Anderson shows the limitations of parent claim 1; however, Anderson does not disclose randomizing the first parameter of the object, or the wriggle behavior. Miyagawa discloses, "a behavior that indicates that the value of the first parameter of the object should be randomized"*(lines 58-60 of column 12: "The random color change range 69 indicates the color range of an object to be changed from a color designated by the color parameter 68.")* and "the object should wriggle or oscillate over time" *(lines 60-63 of column 11: "The random generation area 63 indicates a range wherein the position at which objects are to be generated can be changed at random based on the generation positional coordinates 62.")*.

52. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate a behavior that randomizes a parameter of an object as taught by Miyagawa in the system disclosed by Anderson. The motivation for doing so would have been to emulate natural processes creating phenomena such as "clouds or smoke," as suggested by Miyagawa in

line 67 of column 11. Therefore, it would have been obvious to combine Anderson with Miyagawa to obtain the invention specified in claims 12, 14 and 18.

53. With regard to claim 17, Anderson shows the limitations of parent claim 1; however, Anderson does not disclose a behavior indicating a constant parameter. Miyagawa discloses a "behavior indicates that the value of the first parameter of the object should not change" (*lines 8-10 of column 12: "For objects constantly displayed, the parameter includes a specific value, for example, "0" which represents 'constant'"*).

54. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate a behavior that indicates a parameter of an object should not change as taught by Miyagawa in the system disclosed by Anderson. The motivation for doing so would have been to have a concise and consistent way to represent the behavior of mountains and other static objects, which may appear in each frame without changing appearance. Therefore, it would have been obvious to combine Anderson with Miyagawa to obtain the invention specified in claim 17.

55. **Claims 56-59, 60, 64, 65 and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson.**

56. With regard to **claim 56**, Anderson discloses "a method for generating a frame of an object using behaviors, comprising:

l. determining a current state of the object (*paragraph [0060]: "The object initially assumes a starting state (e.g., position) 801."*);

m. accumulating forces for the behaviors affecting the object (*paragraph [0060]: "The interface acquires a force, e.g., magnitude and direction applied to an input device,*

indicating a desired change in the object's state 802. The interface then combines that force with other forces acting on the object, e.g., forces applied by rules such as gravity emulation 803.");

n. and generating a frame of the object according to the accumulated forces (*paragraph [0060]: "The combined forces affecting the object are used to determine a new state for the object (e.g., a new position, orientation, or deformation), and the sequence repeated."; paragraph [0061]: "After the user interaction is complete, the graphics iteration 810 can be used to generate the final animation visual sequence."*)."

57. With regard to **claim 56,** Anderson teaches behaviors affecting the object (*paragraph [0060]*); however, Anderson does not explicitly disclose "traversing a data structure to identify behaviors affecting the object." Anderson fails to teach "a traversing a data structure."

58. With regard to **claim 68**, Anderson discloses "a method for generating an animation for an object using behaviors, the animation comprising a plurality of frames, the method comprising:

o. for each frame: determining a current state of the object (*paragraph [0060]: "The object initially assumes a starting state (e.g., position) 801."*);

p. accumulating forces for the behaviors affecting the object (*paragraph [0060]: "The interface acquires a force, e.g., magnitude and direction applied to an input device, indicating a desired change in the object's state 802. The interface then combines that force with other forces acting on the object, e.g., forces applied by rules such as gravity emulation 803."*);

q. generating a frame of the object according to the accumulated forces (*paragraph [0060]: "The combined forces affecting the object are used to determine a new state for the object (e.g., a new position, orientation, or deformation), and the sequence repeated."; paragraph [0061]: "After the user interaction is complete, the graphics iteration 810 can be used to generate the final animation visual sequence."*); and

r. outputting the generated frame (*paragraph [0048]: "Input/output device 75 connects with processor 72, communicating applied user controls to processor 72 and communicating feedback to the user responsive to direction from processor 72."*)."

59. With regard to **claim 68,** Anderson teaches behaviors affecting the object (*paragraph [0060]*); however, Anderson does not explicitly disclose "traversing a data structure to identify behaviors affecting the object."

60. With regard to **claims 56 and 68,** Official Notice is taken that both the concept and the advantages of providing a data structure for organizing data for later traversal are well known and expected in the art. It would have been obvious to have included traversing a data structure in Anderson as storing the behaviors in a data structure for a traversal step is known to be a computationally efficient way to maintain and retrieve data.

61. With regard to claim 57, Anderson discloses "determining an initial velocity for the object" (*paragraph [0025]: " Given the initial image, the vector response characteristic, and the applied vector, the computer can determine subsequent images in the sequence."; paragraph [0035]: "Alternatively, the vector generation characteristic can generate a vector having magnitude sufficient to reverse the object's velocity component normal to the surface."*). One of

ordinary skill in the art would recognize that the object inherently has an initial velocity determined by the applied vector from the statements in paragraphs [0025] and [0035].

62. With regard to claim 58, Anderson discloses "at least one of the behaviors is a motion behavior" (*paragraph [0039]: "As with the other rule-based vectors, the user can experiment to achieve the wave motion effect desired, then allow the vector field to apply that desired motion to appropriate objects."*).

63. With regard to claim 59, Anderson discloses "at least one of the behaviors is a simulation behavior" (*paragraph [0031]: "Consider a vector response characteristic where the rate of change of the object's movement in the image is proportional to the applied vector. This relationship parallels the physical relationship F=ma; the user can thus intuitively control objects in the animation by pushing them around just as in the physical world."*).

64. With regard to claim 60, Anderson discloses "at least one of the behaviors is a parameter behavior" (*paragraph [0007]: "...a light source might change in intensity and color according to the direction and magnitude of an applied vector."*).

65. With regard to claim 64, Anderson discloses "identifying collisions (*paragraph [0035]: "In contrast, the wall W3 can have a vector generation characteristic that is activated by a contact between an object and specified boundaries of wall W3."*); and responsive to the existence of a collision, adjusting a system state to maintain a collision constraint (*paragraph [0035]: "In the example animation, wall W3 can have a vector generation characteristic that applies a vector directed normal to the surface having magnitude sufficient to prevent penetration of the object into wall W3."*). Anderson does not disclose traversing a data structure to identify the collision. Official Notice is taken that both the concept and the advantages of

providing a data structure for organizing data for later traversal are well known and expected in the art. It would have been obvious to have included traversing a data structure in Anderson as storing the behaviors in a data structure for a traversal step is known to be a computationally efficient way to maintain and retrieve data.

66. With regard to claim 65, Anderson discloses "iteratively repeating the animating step until a desired frame is reached" (*paragraph [0061]: "This graphics iteration 810 can operate at a lower iteration rate than the haptics iteration 800... After the user interaction is complete, the graphics iteration 810 can be used to generate the final animation visual sequence."*). Anderson does not use the explicit language "a desired frame"; however, one of ordinary skill in the art would recognize that the system disclosed would be inoperable if the iteration was not discontinued at a predetermined "desired" frame from paragraph [0053]: The user can reply the animation, at various speeds, applying corrective force inputs to tweak the motion until the legs and body look like the user desires.

67. **Claims 56 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent Application Publication No. 2001/0030647 A1 to Sowizral et al (herein referred to as "Sowizral et al") in view of Anderson.**

68. With regard to claim 56, Sowizral discloses "a method for generating a frame of an object using behaviors, comprising:

s. determining a current state of the object (*paragraph [0061]: "The geometry structure may be configured to contain the current consistent state of all spatially-located renderable objects."*);

t. traversing a data structure to identify behaviors affecting the object (*paragraph [0064]: "The scene graph comprises locale node 54, transform nodes 66A-D, view platform 74, light node 90, behavior node 92, Shape3D node 64, appearance node component 70 and geometry node component 72 ";paragraph [0065]: "As shown in the figure, as the scene graph is created or initially traversed, a parallel configuration comprising a number of structures 200-210 is generated, each structure is responsible for a particular type of object in the scene graph."*);

69. One of ordinary skill in the art would recognize that the Render bin 210 renders the frame based on the behavior structure 208 from the paragraph [0165]: "The first Renderer thread invocation is responsible for rendering all visible objects into the Canvas3D. Once it has completed, the second Renderer thread invocation will perform the buffer swap. After the buffer swap has been completed, MasterControl may be configured to notify the BehaviorScheduler that a frame has elapsed. That notification triggers the behavior again, and the process continues."

70. Sowizral et al does not expressly disclose accumulating forces for the behaviors or rendering based on the accumulated forces. Anderson discloses accumulating forces affecting the object (*paragraph [0060]: "The interface acquires a force, e.g., magnitude and direction applied to an input device, indicating a desired change in the object's state 802. The interface then combines that force with other forces acting on the object, e.g., forces applied by rules such as gravity emulation 803."*); and generating a frame of the object according to the accumulated forces (*paragraph [0060]: "The combined forces affecting the object are used to determine a new state for the object (e.g., a new position, orientation, or deformation), and the sequence*

repeated."; paragraph [0061]: "After the user interaction is complete, the graphics iteration 810 can be used to generate the final animation visual sequence.")."

71. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate forces as disclosed by Anderson in the system disclosed by Sowizral et al. The motivation for doing so would have been to model the physical properties of real world to obtain realistic animation. Therefore, it would have been obvious to combine Sowizral et al with Anderson to obtain the invention specified in claim 56.

72. Claim 61 is met by the combination of Sowizral et al and Anderson, wherein Sowizral et al discloses "the data structure comprises a tree structure" (*paragraph [0012]: "Advantageously, the system may utilize a parallel structure for rendering and thereby avoid repeated traversals of the scene graph in its hierarchy (i.e., tree) form."*)

73. **Claims 62 and 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson in view of David Baraff, "Analytical methods for dynamic simulation of non-penetrating rigid bodies," July 1989, Computer Graphics Vol. 23 No. 3, p. 223-232 (herein referred to as "Baraff") in further view of William H. Press, Brian P. Flannery, Saul A. Teukolsky, William T. Vetterling, "Numerical Recipes in C: The Art of Scientific Computing," October 30, 1992, p. 710-714 (herein referred to as "Press et al").**

74. With regard to claims 62 and 63, Anderson discloses a physical simulation; however, Anderson does not expressly disclose the details of solving the simulation. Baraff discloses using "a mid-point method differential solver to determine a new parameter value for the object" (*2nd paragraph of section 5: "Our simulator iterates through time (time steps) by solving a first order system of coupled ordinary differential equations[1, 2]...We adopt the usual method for solving*

the system of differential equations by using numerical integration procedures such as fourth order Runge-Kutta or Adams-Moulton [17] with adaptive time-step parameters."). One of ordinary skill in the art would recognize that equations for motion for rigid body dynamics would determine a new position, as in claim 63, for an object the physical simulation.

75. At the time of the invention, it would have been obvious to use a "differential solver" as taught by Baraff to determine a new position for the object in Anderson. The motivation for doing so would have been to increase the overall realism of the animation by mathematically modeling physical process such as rigid body motion, as suggested by Baraff in the Abstract.

76. Baraff discloses using a fourth order Runge-Kutta method, but does not teach a midpoint method (second order Runge-Kutta method.) Press et al discloses "a mid-point method differential solver" (Figure 16.1.2, p 711).

77. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a mid-point method as the differential solver as taught by Press et al in the system disclosed by the combination of Anderson and Baraff. The motivation for doing so would have been to make the best use of computational resources to achieve the level of simulation precision and computational effort required, at the suggestion of Press et al in the sixth paragraph of section 16.1 on page 711. Therefore, it would have been obvious to further modify the combination of Press et al with Anderson and Baraff to obtain the invention specified in claims 62 and 63.

78. **Claim 69 is rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson in view of U.S. Patent No. 5,673,380 to Suzuki (herein referred to as "Suzuki").**

79. With regard to claim 69, Anderson meets the limitation of "determining, traversing, accumulating, generating and outputting steps" as shown in the rejection of parent claim 68; however, Anderson does not disclose these operations performed concurrently for a first and second frame. Suzuki discloses performing rendering operations concurrently for multiple frames (*lines 25-28 of column 7: " In a manner similar to the above, the calculation processes and the display processes from a fourth frame F4 to a final frame Fn are simultaneously performed in parallel."*).

80. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify the method and system disclosed by Anderson to perform multiple operations for different frames concurrently as disclosed Suzuki. The motivation for doing so would have been improve performance as suggested by Suzuki in lines 38-41 of column 7: "That is, the display can be realized by the half processing time as compared with that of the conventional successive processes of the calculating process and the display process in FIG. 2." Therefore, it would have been obvious to combine Anderson with Suzuki to obtain the invention specified in claim 69.

81. **Claims 76 and 79 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson with regard to U.S. Patent No. 6,266,053 to French et al (herein referred to as "French et al").**

82. With regard to claims 76 and 79, Anderson discloses "outputting the original animation and outputting the updated animation" as shown in the rejection of parent claim 1 and "rendering a plurality of frames" (*811 of figure 8*); however, Anderson does not disclose "caching the

rendered frames" as in claim 76, or "periodically caching a subset of the rendered frames in an interval cache" as in claim 79.

83. French et al discloses "caching the rendered frames" (*lines 45-48 of column 14: "The cache is opened in append mode, then each frame is displayed and cached in sequence, finally the cache is closed and the sequence can be replayed at full speed."*) as in claim 76, and "periodically caching a subset of the rendered frames in an interval cache" (*lines 60-62 of column 13: "There may be frame caches for a particular instant, or extended cached clips, which have a finite duration."*) as in claim 79.

84. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate a cache for frames as taught by French et al in the system disclosed by Anderson. The motivation for doing so would have been to accelerate playback of the frames. Therefore, it would have been obvious to combine Anderson with French et al to obtain the invention specified in claims 76 and 79.

85. **Claims 80 and 81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson in view of Sowizral et al.**

86. With regard to claim 80, Anderson discloses the limitations of parent claim 71; however, Anderson does not disclose multi-threaded rendering. Sowizral discloses "outputting the original animation and outputting the updated animation each comprise evaluating, by a first thread, a first subset of frames, and evaluating, by a second thread, a second subset of frames" (*paragraph [0015]: "The render bin may have one or more render threads associated with it, thereby enabling parallel rendering utilizing multiple processors."; paragraph [0014]: "Each structure*

may be an object that manages selected data from the scene graph, and the plurality of threads may be executable to render one or more frames corresponding to the scene graph.").

87. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate multiple threads, as taught by Sowizral et al, in the system disclosed by Anderson for evaluating subsets of frames. The motivation for doing so would have been to improve performance. Therefore, it would have been obvious to combine Anderson with Sowizral et al to obtain the invention specified in claim 80.

88. With regard to claim 81, Sowizral does not expressly disclose "the first subset and the second subset of frames each comprise alternate frames of the animation." It would have been obvious for one of ordinary skill in the art at the time of the invention to alternate subsets of frames of the animation. The motivation for doing so would have been to improve performance, as one of ordinary skill in the art would recognize that adjacent subsets of frames would be displayed sequentially. Therefore, it would have been obvious to further modify the combination of Sowizral et al and Anderson to obtain the invention specified in claim 81.

89. **Claim 82 is rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson in view of Timothy J. Purcell, Ian Buck, William R. Mark, and Pat Hanrahan, "Ray Tracing on Programmable Graphics Hardware," July 2002, ACM Transactions on Graphics, Volume 21, Number 3, pp. 703-712 (herein referred to as "Purcell et al").**

90. With regard to claim 82, Anderson et al discloses "in a computer-implemented animation system, a method for animating an object, the method comprising:

u. receiving a first input, the first input specifying a first behavior, the first behavior indicating how to change a value of a parameter of the object over time (*paragraph*

[0008]: "Vectors can be assigned by rule, e.g., gravitational effects, wave motion, and motion boundaries. The user can supply additional vectors to refine the animated motion or behavior"; paragraph [0060]: "The interface acquires a force, e.g., magnitude and direction applied to an input device, indicating a desired change in the object's state 802."; Figure 1 shows an object changing position over time);

v. generating a plurality of frames according to the specified behavior (*Figure 1*);

w. and outputting the plurality of frames (*paragraph [061]: "After the user interaction is complete, the graphics iteration 810 can be used to generate the final animation visual sequence."; 811 of Figure 8*).

91. Anderson discloses using ray tracing to obtain a plurality of frames (*paragraph [0058]: "Once the animation of the object is defined, the actual images can be generated using conventional animation tools, for example, ray tracing."*); however, Anderson does not disclose a vertex shader and a pixel shader. Purcell discloses using "least one of a pixel shader and a vertex shader to generate a plurality of frames of the object" (*1st paragraph of section 2.1: "This vertex program is run on each incoming vertex and the computed results are passed on to the rasterization stage... Pixel shaders, like vertex programs, provide a 4-way SIMD instruction set augmented with instructions for texturing, but unlike vertex programs operate on fixed-point values."*).

92. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate vertex and pixel shaders as taught by Purcell to generate a plurality of frames in the system and method disclosed by Anderson. The motivation for doing so would have been to improve performance by exploiting the "highly-parallel vertex and fragment

shading code" as suggested by Purcell et al in the third paragraph of section 1. Therefore, it would have been obvious to combine Anderson with Purcell et al to obtain the invention specified in claim 82.

Conclusion

93. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent No. 6,285,380 to Perlin shows behavior based animation.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Repko whose telephone number is 571-272-8624. The examiner can normally be reached on Monday through Friday 8:30 am -5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on 571-272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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